

Independent claims 10, 35, 49, and 52 are directed to composite materials or structures comprising a thermoplastic and a fabric coated with an active thermal protective material selected from the group consisting of subliming and intumescent materials, the coated fabric being embedded in or otherwise adhered to the thermoplastic. In the PCT Preliminary Examination Report, the Examiner has indicated that these claims lack an inventive step over either Freeman et al or Seizert, in view of Horrocks et al. It is respectfully submitted that this position is unfounded.

Horrocks et al. teaches a special fabric which is itself a fire barrier, for use in such applications as fire protective clothing and aircraft seat cushions. The fabric is contrasted with a "quite different approach" to render materials resistant to fire by applying an intumescent coating, which cannot be used on all substrates or where flexibility is essential (col. 1, line 66 to col. 2, line 11). The Horrocks et al. barrier fabric material comprises an intimate mixture of organic intumescent filler and fibres, both adapted to char intensely within a particular temperature range. (Col. 2, lines 20-23.) The composite fabric preferably includes facing layers and a core made of the filler and fibres. The preferred core material is a non-woven fabric structure. At column 3, lines 33-48, Horrocks says:

During manufacture of the materials of the present invention, the intumescent should be applied to the fibre assembly in a manner which allows it to penetrate into the core of the assembly (as opposed to forming an exterior coating). Thus in one example, the intumescent is simply sprinkled in powder form on to a nonwoven, woven or knitted fabric core of the composite structure. Alternatively, it may be introduced between different layers of the fibres during assembly of the core. Other ways of dispersing the intumescent in the fibrous layer may also be applicable e.g. spraying in the intumescent during the formation of a fibrous felt.

Optionally, the intumescent powder is initially bonded to the fibres by an adhesive. Alternatively, an initial fibre-intumescent adhesion may be achieved by introducing a fusible adhesive copolymer into the intumescent.

In the Horrocks et al. system, the fibers may optionally be "precoated" with an adhesive to hold the intumescent on the fibers, but the resulting structure is not a "fibrous reinforcing material." The function of the fabric is to act as a barrier, not to reinforce anything.

Applicants readily concede that coating a fabric with an active thermal protective composition has long been known. Fiberglass fabric is routinely embedded in thermal protective coating compositions to give the coating strength in normal use and in case of a fire. For example, U.S. Patent 4,493,945, to Feldman (one of the inventors of the present application) teaches that when thermal protective coating materials (such as intumescent and subliming coatings) are applied to substrates, a reinforcing material such as fiberglass mesh has been embedded in the coating material to strengthen the material and prevent it from cracking or falling off the substrate under conditions of flame or thermal extreme. That patent further states that,

Sometimes the materials are first applied to a reinforcing structure such as a flexible tape or flexible wire mesh, and the combined structure is applied to the substrate. Examples of this approach are found in Feldman, U.S. Pat. No. 3,022,190, Pedlow, U.S. Pat. No. 4,018,962, Peterson et al, U.S. Pat. No. 4,064,359, Castle, U.S. Pat. No. 4,276,332, and Fryer et al, U.S. Pat. No. 4,292,358. In these last-mentioned systems, the purpose of the reinforcing structure may be both to strengthen the resulting composite and to permit its application to a substrate without directly spraying, troweling or painting the uncured coating materials onto the substrate. In any of the foregoing methods and structures, multiple layers are frequently applied to the substrate to provide additional protection. (Col. 1, lines 44-59)

Likewise, Feldman's earlier United States Patent No. 3,022,190 states:

An example of a woven fabric impregnated with sublimite is as follows:

A piece of fiberglass cloth is dipped in a slurry of the composition of Example 8, and dried. This fabric can be used as is, as a heat barrier, or it can be laminated with other fabrics or with rigid materials, to serve as reinforcing. Several sublimite impregnated fabrics or rigid materials, or both, may be laminated.

The part to be cooled can serve as one of the laminae. The laminations can be bonded by any suitable material, such as phenolic or epoxy resins. (Col. 7, lines 41-51)

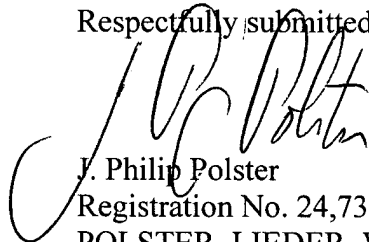
Absent applicant's present disclosure, the generalized statements in the Feldman '945 and '190 patents give no suggestion of the invention as claimed in independent claims 10, 35, 49 and 52. All of these claims call for a fabric coated, precoated, or treated with an active thermal protective material selected from the group consisting of subliming materials and intumescent materials. Each claim contains more than this. Thus, claim 10 calls for a composite material comprising at least one layer containing a thermoplastic, the layer having embedded therein a fabric, the fabric being coated with an active thermal protective material. Claim 35 calls for a structure comprising an organic resin having embedded therein a fabric, the fabric being precoated with an active thermal protective material. Claim 49 calls for a composite structure comprising a substrate formed at least in part of a thermoplastic material and a fabric coated with an active thermal protective material, the substrate adhering chemically and mechanically to the pretreated mesh fabric. Claim 52 calls for a composite structure comprising a substrate formed at least in part of a polyolefin, and a mesh fabric treated with an active thermal protective material, the treated mesh fabric having from 0.5 to 30 openings per square

centimeter, the substrate adhering chemically and mechanically to the pretreated mesh fabric.

Nothing in Horrocks et al., taken alone or in combination with Freeman et al. or Seizert, suggests that it would be desirable (or even possible) to substitute the Horrocks et al. composite non-woven (or equivalent) fabric barrier for the fiberglass of Seizert or Freeman et al. Likewise, nothing in either Feldman patent, taken alone or in combination with Freeman et al. or Seizert, suggests embedding a reinforcing fabric treated or coated with an active thermal protective composition in a substrate, or adhering the substrate chemically and mechanically to the pretreated mesh fabric. The only suggestion that the references be combined as called for in the claims comes from applicant's disclosure. The invention, as claimed, represents a dramatic, unexpected, and inventive improvement in the construction of the claimed structures. It is respectfully submitted that the claims as presented would not have been obvious to those skilled in the art at the time the invention was made in view of the prior art.

Should the Examiner have any questions or suggestions, he or she is urged to call applicants' undersigned attorney, J. Philip Polster, at 314-872-8118.

Respectfully submitted,

  
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